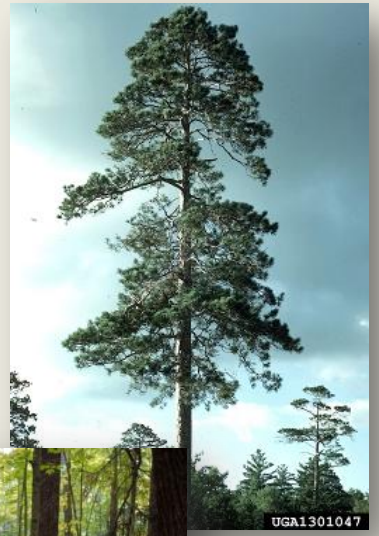
Eastern white pine

(*Pinus strobus*)



White pine is one of the **largest and most long-living tree species** in Wisconsin. It was once a very significant component of our northern forests but most large trees were harvested during the Cutover at the turn of the century. Today, fortunately, white pine is making a comeback.

The white pine resource has **more than doubled in volume** in the last two decades**.** The number of trees in all size classes has increased significantly indicating that white pine should remain a major species in future forests.

Growth rates are high and increasing. Mortality rates have also increased but are still quite low. For instance, white pine accounts for almost 7% of all volume in trees in Wisconsin, and 9% of growth but **only 3% of total mortality**.

In 2003, white pine made up less than 3% of roundwood production and is mainly used for pulpwood and sawlogs. The density of white pine wood is very low making it a less desirable species for biomass production.

- *How has the white pine resource changed?*
  Volume and diameter class distribution: 1983, 1996, and 2008
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"How has the white pine resource changed?"

Growing stock volume and diameter class distribution by year

The growing stock volume of white pine in Wisconsin in 2008 was over 1.4 billion cft or about 6.8% of total statewide volume (Chart 1). **White pine volume has more than doubled since 1983 and has increased 53% in the last ten years**. Volume in all size classes has increased about equally (Chart 2).

The **numbers of trees in all size classes has increased** significantly (Chart 3), including an increase of 63% in the number of seedlings and saplings. This indicates that white pine will probably play a very significant role in future forests of Wisconsin.

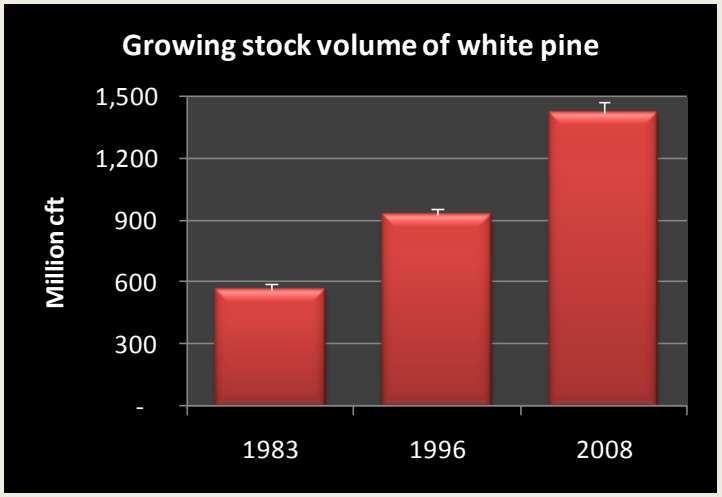


Chart 1. Growing stock volume (million cubic feet) by inventory year.
Source: USDA Forest Inventory and Analysis data: 1983, 1996, and 2008.

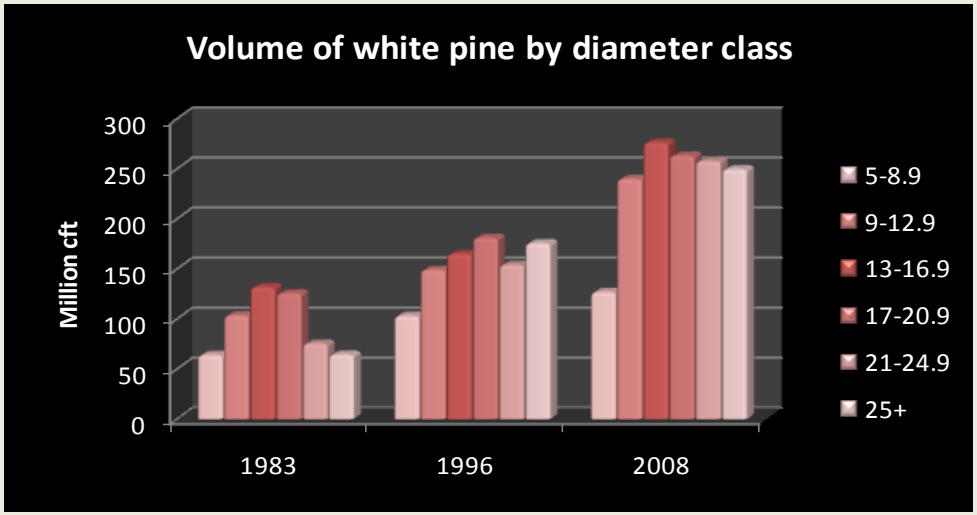


Chart 2. Growing stock volume (million cubic feet) in 1983, 1996, and 2008.
Source: USDA Forest Inventory and Analysis data: 1983, 1996, and 2008.

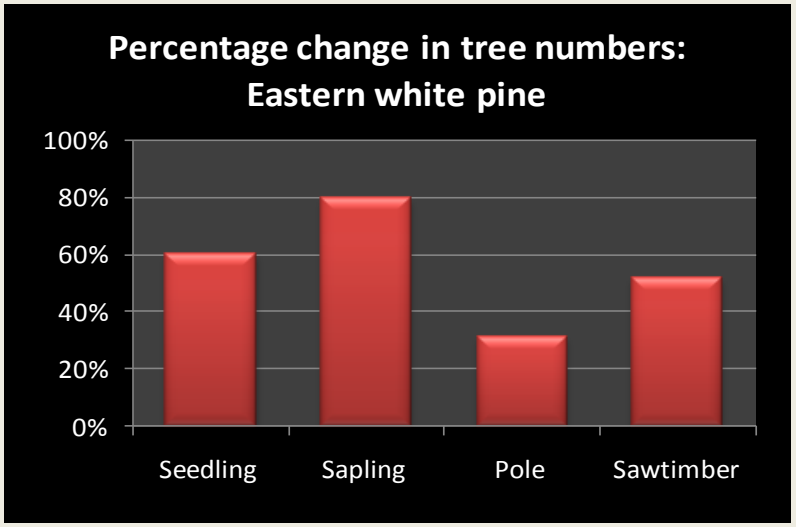
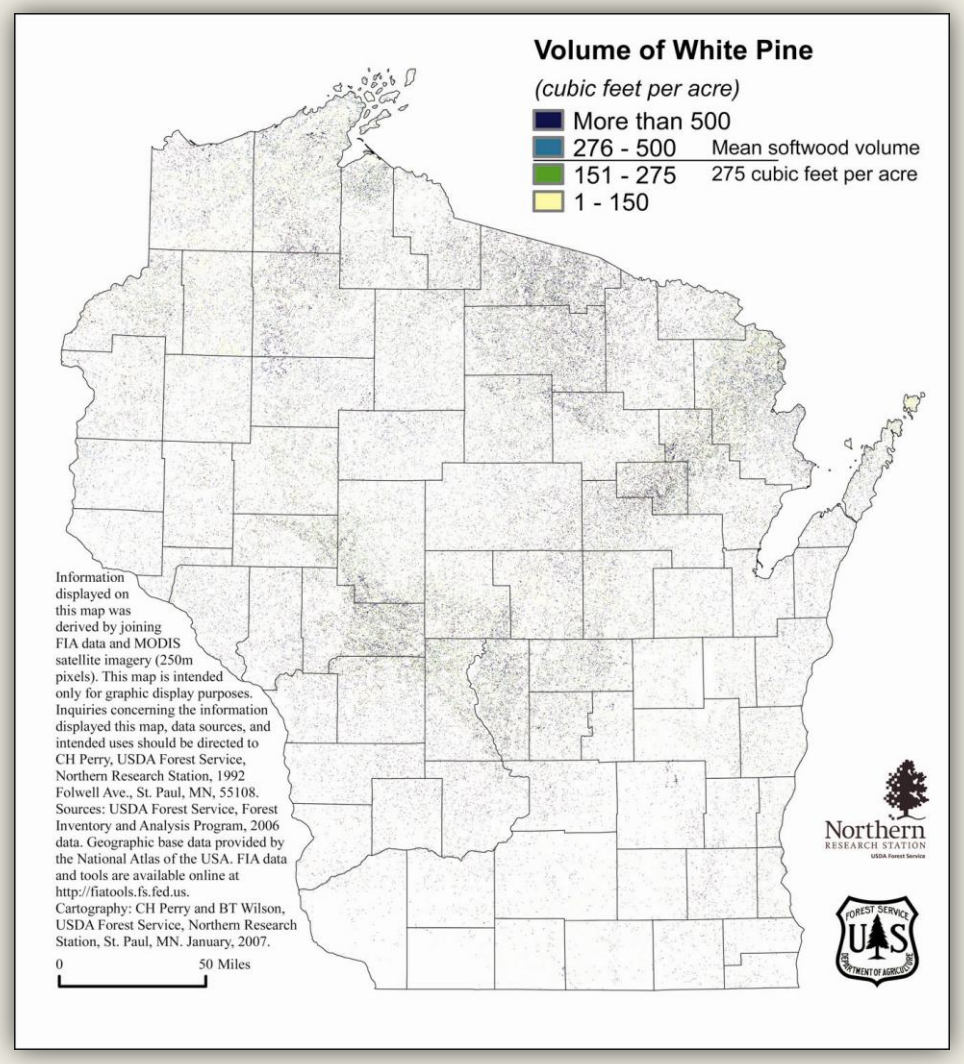


Chart 3. Percentage change in the number of live trees by size class between 1996 and 2008.
Source: USDA Forest Inventory and Analysis data 1996, and 2008.

"Where does white pine grow in Wisconsin?"

Growing stock volume by region with map



Eastern white pine is a common species in northern and central forests (Table 1).

In addition to the pine forest types, white pine is typically found in combination with hardwoods in the oak-hickory, oak-pine, aspen-birch and maple-basswood forest types.

Table 1. Growing stock volume (million cft) by species and region of the state.

Species	Central	North east	North west	South east	South west	Total	Percent of total
White Pine	426	505	342	54	93	1,421	**100%**
Percent of total	**30%**	**36%**	**24%**	**4%**	**7%**	**100%**	

Source: USDA Forest Service, Forest Inventory and Analysis 2008 data

Additional tables:

Volume by county in 2008 (pdf; Excel)

"How fast is white pine growing?"

Average annual net growth by region and year

Average annual net growth of eastern white pine is about 53 million cft/yr, representing 9% of statewide volume growth (Chart 4). Growth rates have increased significantly in the last 23 years, more than tripling since 1983.

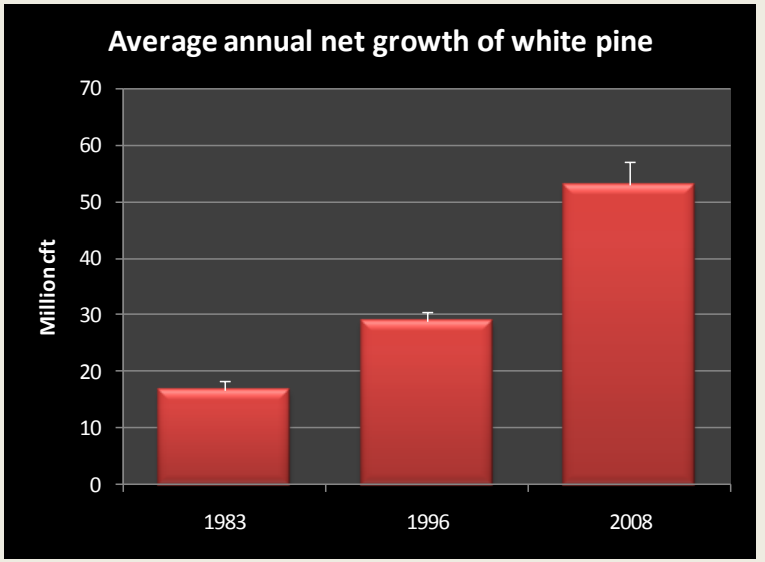


Chart 4. Average annual net growth (million cubic feet).
Source: USDA Forest Inventory & Analysis data: 1983, 1996, 2008

Table 2. Average annual net growth (million cft/year) of growing stock and the ratio of growth to volume by region of the state.

Region	Net growth	Percent of Total	Ratio of growth to volume
Central	18.1	34%	**4.3%**
Northeast	17.2	33%	**3.4%**
Northwest	12.0	23%	**3.5%**
Southeast	2.4	4%	**4.3%**
Southwest	3.2	6%	**3.5%**
Statewide	**52.9**	**100%**	**3.7%**

Source: USDA Forest Inventory and Analysis 2008

Volume growth of white pine is fairly even across northern and central Wisconsin but growth to volume ratios are higher in southeast and central parts of the state (Table 2).

The average statewide ratio for white pine is 3.7%, higher than the statewide average of 2.8% for all species.

Additional tables:
Average annual growth, mortality and removals by region (Pdf, Excel).

"How healthy is white pine in Wisconsin?"

Average annual mortality: 1983, 1996, and 2008

Average annual mortality of white pine, about 6 million cft per year in 2008, has increased 56% since 1996 (Chart 5). However, the percent of statewide mortality is less than the percent of volume; white pine accounts for almost 7% of total growing stock volume in the state but only 3% of total mortality.

The ratio of mortality to gross growth is 10.2% for white pine, **much lower than the statewide average** of 25.8%.

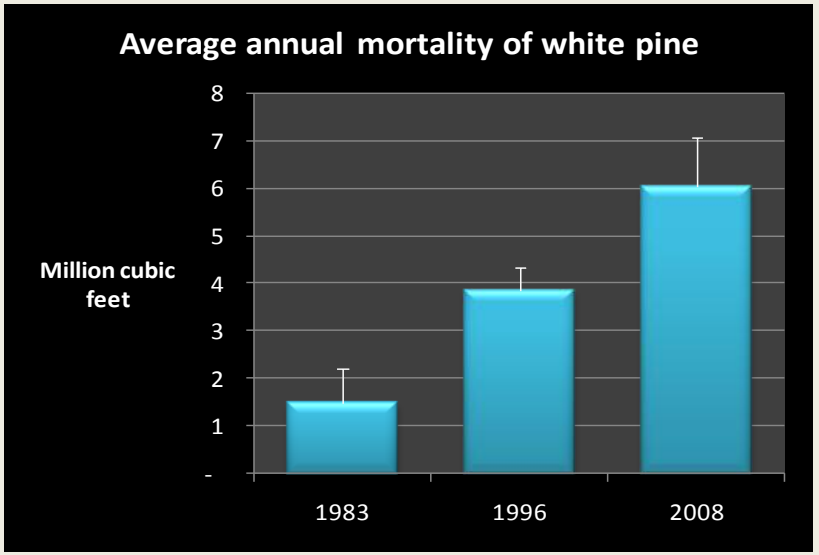


Chart 5. Average annual mortality (million cubic feet) by inventory year.
Source: USDA Forest Inventory & Analysis data: 1983, 1996, and 2008

Table 3. Mortality, gross growth and the ratio of mortality to gross growth.

Species	Average annual mortality (cft)	Average annual gross growth (cft)	Mortality / growth
Eastern White Pine	6,042,641	58,977,102	**10%**

Source: USDA Forest Inventory & Analysis data: 2008

Additional tables:
Average annual growth, mortality and removals by region (Pdf, Excel).

"How much white pine do we harvest?"

Roundwood production by product and year

In 2003, white pine accounted for 10.9 million cft or about 2.6% of Wisconsin's total roundwood, about half in sawlogs and half in pulpwood (Chart 6).

From 2003 to 2006, pulpwood production decreased by 7%. White pine supplies 4.4 million cft or over 3% of total pulpwood production.

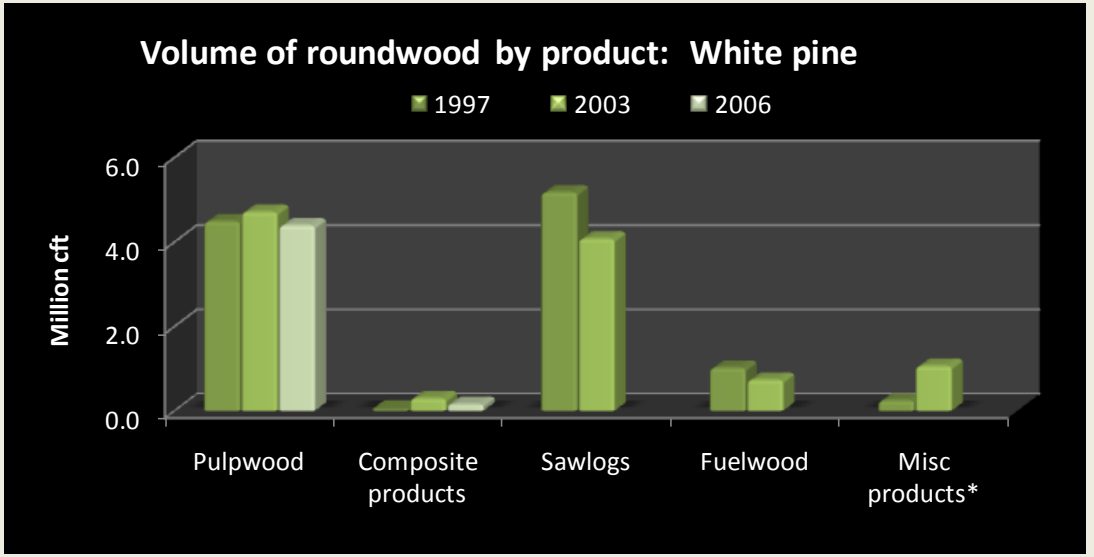


Chart 6. Volume of roundwood products. The most recent numbers for pulpwood and composite products are from 2006 and the most recent numbers for sawlogs, fuelwood and miscellaneous products are from 2003 (Ron Piva).
* Miscellaneous products include poles, posts, pilings and veneer.
Source: Timber Products Output Mapmaker, http://ncrs2.fs.fed.us/4801/fiadb/rpa_tpo/wc_rpa_tpo.ASP

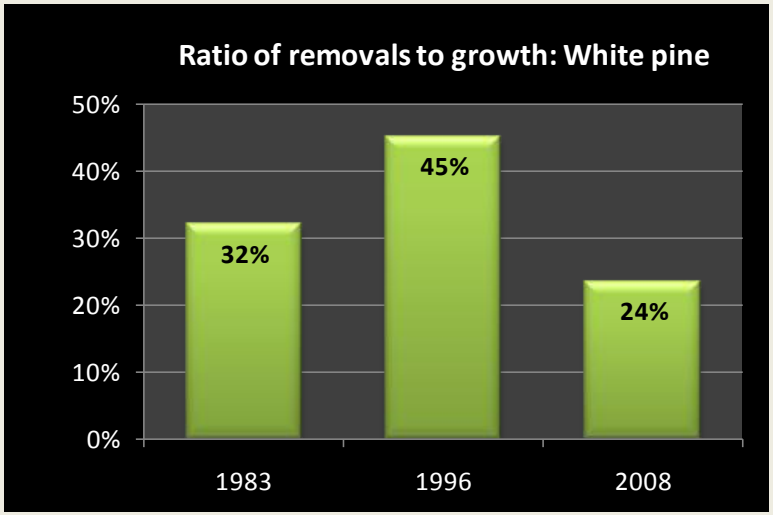


Chart 7. Ratio of volume harvested annually to net growth.
Source: USDA Forest Inventory & Analysis data: 1983, 1996, and 2008.

The ratio of removals to growth for eastern white pine was 24% in 2008, less than half the average ratio of 56% for all species.

The ratio of growth to removals has fallen 21% from 1996. This change may be accounted for by a decrease of 5% in removals as well as an increase of 9% in the growth rate.

Additional tables:
Average annual growth, mortality and removals by region (Pdf, Excel).

"How much is white pine selling for?"

Prices for cordwood & sawtimber: 2000 to present

Due to the variability of timber prices from year to year and region to region, two methods of reporting prices are presented here: Timber Mart North and average weighted stumpage prices from Wisconsin Administrative Code Chapter NR 46.

Stumpage prices for sawtimber, as reported in the Timber Mart North (Chart 8), have increased about 13% since 2002. Delivered sawlogs, on the other hand, have decreased in price by 33% since 2002.

Average weighted stumpage values, as reported in NR46 (Table 4), peaked in 2006 and have fallen since.

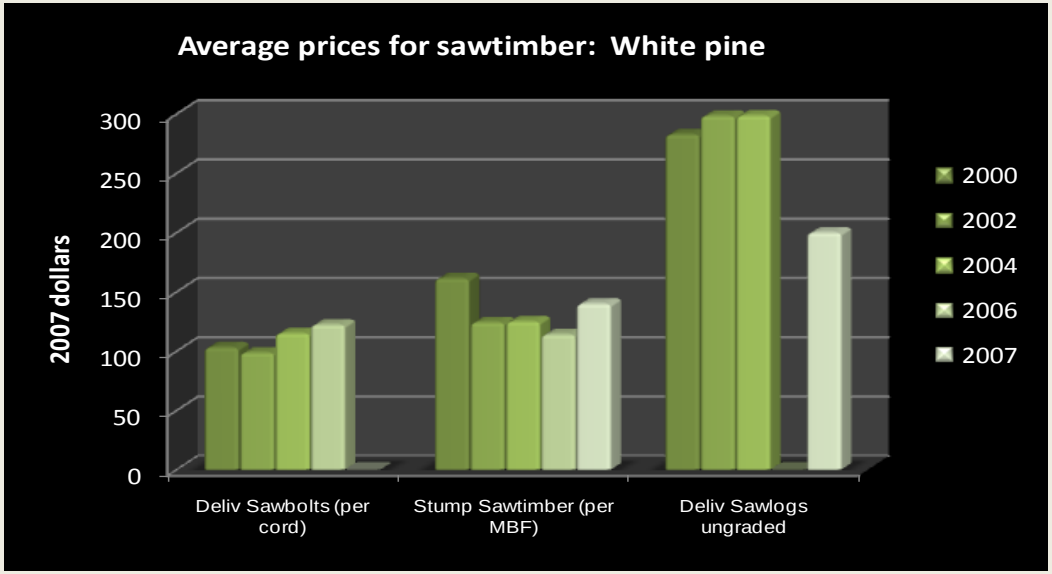


Chart 8. Average prices for cordwood and sawtimber (2007).
Source: Timber Mart North, George Banzhaf & Company, 8301 N. Allen Lane, Milwaukee, WI 53217

Table 4. Average weighted stumpage prices (adjusted for inflation to 2009 dollars) by year for Wisconsin.

Product	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Average for all softwoods
Cordwood (per cord)	$32	$36	$29	$30	$32	$31	$42	$33	$20	**$21**	$23
Logs (per MBF)	$177	$162	$136	$160	$158	$172	$234	$198	$122	**$114**	$76

Source: Wisconsin Administrative Code Chapter NR46, 2000 to 2009

"How much white pine biomass do we have?"

Oven-dry tons by region of the state

There were 24.6 million oven-dry tons (ODT) of white pine biomass in 2008, an increase of 7.5 million ODT or 44%, from 1996. This species represents only 4% of all live biomass statewide. As with volume, most white pine biomass is located in northern and central Wisconsin (Chart 9).

The density of white pine wood is fairly low with a ratio of biomass to volume of only 32.5 oven-dry lbs. per cubic foot (ODP/cft). The average for all softwoods is about 34.3 ODP/cft and for all species is 50.1 ODP/cft.

Over 82% of all white pine biomass is located in the main stem and 14% in the branches.

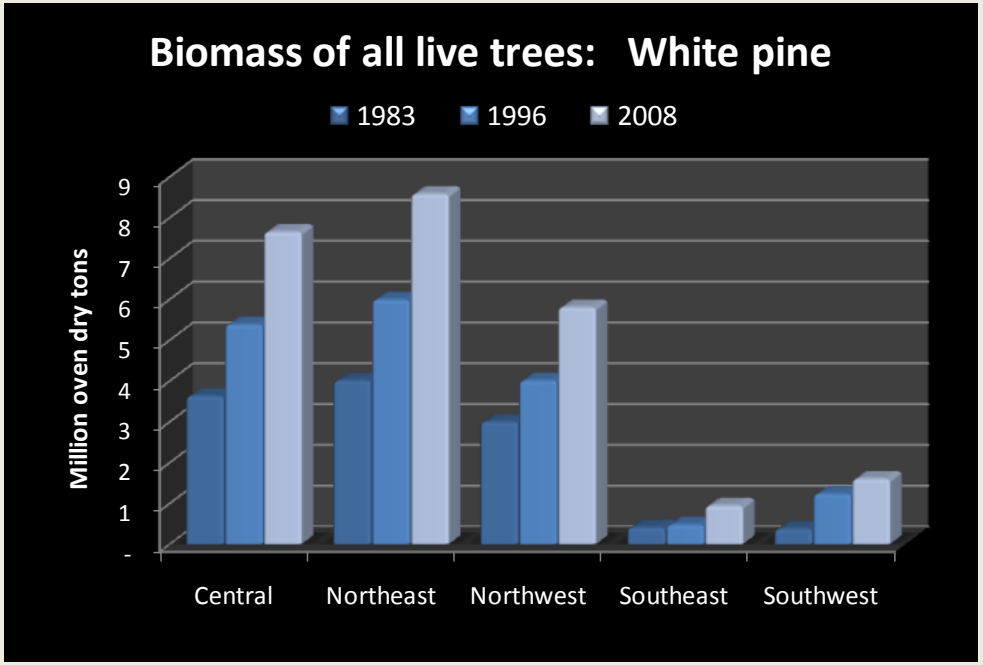


Chart 9. Biomass (million oven-dry tons) by year and region.
Source: USDA Forest Inventory & Analysis data: 1983, 1996, and 2008

Additional tables:
Biomass by county in 2008 (pdf; Excel)